

such as well-fitting gloves, masks, and protective eyewear, should be readily available. Consideration should also be given to monitoring the compliance with infection-control policies so that appropriate remedial interventions can be instituted. Supervisors should be responsible for assuring that employees are aware of the hazard and are complying with required work practices.

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REFERENCES

- CDC: Recommendations for prevention of HIV transmission in health care settings. *MMWR* 1987; 36 (suppl 25): 35-185
- Gerberding JL, Bryant-LeBlanc CE, Nelson KN, et al: Risk of transmitting the human immunodeficiency virus, cytomegalovirus, and hepatitis B virus to health care workers exposed to patients with AIDS and AIDS-related conditions. *J Infect Dis* 1987 Jul; 156:1-8
- Henderson DK, Saah AJ, Zak BJ, et al: Risk of nosocomial infection with human T-cell lymphotropic virus type III/lymphadenopathy-associated virus in a large cohort of intensively exposed health care workers. *Ann Intern Med* 1986 May; 104:644-647

Marijuana Testing

THE ANALYSIS of urine to detect drug use is widely used today to protect employee health and safety and to help maintain industrial quality and productivity. Marijuana testing procedures are of concern because the results are more difficult to interpret than results for other abused substances. Urine is currently the specimen of choice, being easier to test than either blood or saliva and, when testing positive, it will remain so for a longer period of time. Urine testing is less invasive, less costly, and has a shorter turnaround time than blood testing.

Marijuana (Δ^9 -tetrahydrocannabinol [THC]) enters the circulation rapidly by smoking (minutes) and more slowly by ingestion (1½ to 3 hours) and is so highly metabolized that only a small fraction that enters the bloodstream is excreted unchanged in the urine. THC is rapidly converted by hepatic enzymes to several metabolites, the most prevalent of which is THC carboxylic acid. THC is stored mostly in adipose tissue and may accumulate faster than it can be removed in persistent users. For example, in a person using three or more joints per day who stops smoking marijuana completely and then adopts an exercise fitness program, thereby mobilizing body fat, urine specimens will test positive for THC at 50 ng per ml to 100 ng per ml or more for over two months, whereas one who smokes an occasional joint will test positive at from 50 to 100 ng per ml or more for three to four days. In addition, passive inhalation of marijuana smoke by nonusers occasionally will result in a concentration of 20 ng per ml and in rare cases as high as 40 ng per ml. THC testing is divided into sensitive screening tests (presumptive) and specific confirmatory tests (definitive). Most current screening technology involves immunoassay techniques, the private sector using primarily the enzyme-multiplied-immunoassay technique—EMIT-d.a.u. for a large number of specimens (more accurate), and EMIT-st for a small number of specimens (less accurate) (Syva Corporation)—whereas the federal government and military prefer the radioimmunoassay (RIA, Roche). A fluorescent immunoassay technique using polarized light—known as TDx (Abbott Laboratories)—has recently become available.

Abnormal immunoassay results do not necessarily imply the presence of THC, as any other agent in the specimen that binds to the antibody will result in a false-positive test. Also, the EMIT screen may test false-negative if a specimen is

adulterated by the addition of bleach, detergent, salt, or vinegar or diluted with water from a tap or a toilet bowl.

Gas chromatography/mass spectrometry (GC/MS) is currently the most reliable confirmatory technique. In terms of analytic accuracy, EMIT-d.a.u. has a specificity in the range of 90% and a sensitivity in the range of 95%. GC/MS has a specificity of greater than 99.9% and a sensitivity of greater than 99.9%. Thus, a combination of screening by EMIT and confirmation by GC/MS will yield virtually 100% accuracy in testing for marijuana.

Marijuana testing as part of a well-designed program for the screening of employees and applicants for substances of abuse may help define the magnitude and seriousness of the problem and protect and improve health and safety in an ethically acceptable manner.

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REFERENCES

- Drug screening in the workplace: Ethical guidelines, committee report. *J Occup Med* 1986; 28:1240-1241
- Hawks RL, Chiang CN (Eds): *Urine Testing for Drugs of Abuse*. National Institute on Drug Abuse Research Monograph #73, 1986
- Moyer TP, Palmen MA, Johnson P, et al: Marijuana testing—How good is it? *Mayo Clin Proc* 1987 May; 62:413-417

Occupational Health Implications of a Toxic Spill of Propylene Dichloride

GIVEN THE ENORMOUS VOLUME of potentially hazardous materials being transported, it is inevitable that clinicians will see patients who have been exposed as a result of accidental spills.

On February 5, 1981, a truck containing propylene dichloride leaked 2,000 gallons. Propylene dichloride is a volatile chlorinated hydrocarbon that is a mucous membrane irritant and a central nervous system depressant. As a result, hundreds of people were evacuated from their homes; 129 persons were treated at a nearby emergency department, 15 of these being admitted to hospital. The persons exposed included truck drivers who were also present at the site of the spill, 2 California Highway Patrol officers, 12 firefighters, and a number of hospital employees who were secondarily exposed as a result of contact with the victims' contaminated clothing. A number of those persons had persistent complaints.

Propylene dichloride and closely related materials have been used as soil fumigants for a number of years. Unfortunately, there have been previous incidents involving the accidental release of propylene dichloride or related materials in combination with other agents. Some of those exposed experienced a good deal of chest discomfort, dyspnea, and cough; of this group, some had persistent chest pain or discomfort and fatigue.

Physicians involved in treating workers exposed to such an accident or release face many challenges. A step-by-step approach for the management of these types of exposures has been outlined. Indeed, the emergency department experience of persons in the above-cited accident reinforces the need for advance planning for both examination and treatment. The treatment of patients who have inhaled irritant materials in general focuses on supportive management. This includes the use of oxygen, bronchodilators where important, and, in the view of some authors, the use of systemic steroids to minimize complications.